

REMARKS

Claims 1, 5-16, and 19-31 are pending in the application. Claims 1, 7, 14, 16, and 21 are currently amended. Please cancel claims 19, 20, 22, 24, 27, 30, and 31.

Claim Rejections – 35 USC 112

Claims 22, 24, 27, 30, and 31 were rejected by the Examiner as failing to comply with the written description requirement, and as failing to comply with the enablement requirement. Claims 22, 24, 27, 30, and 31 have been cancelled.

Claims 19, 20, and 31 were rejected by the examiner as being indefinite. Claims 19, 20, and 31 have been cancelled.

Claim Rejections – 35 USC 102

Claims 1, 6, 14, 15, 21, and 26-31 have been rejected under 35 USC 102(b) as being anticipated by the patent issued to Isono et al (PN 5,315,377).

Claims 1, 14, and 21 have been amended. Claim 6 depends from claim 1, and claim 15 from claim 14. Claim 26 depends from claim 14, which has been amended. Claims 28 and 29 depend from claim 1, which has been amended. Claims 27, 30, and 31 have been cancelled.

Each of the amended claims 1, 14, and 21 has been amended to specify that the subareas forming both the transparent and the opaque portions of the parallax barrier of the present invention comprise a plurality of *horizontally contiguous* individually switchable elements, and to further specify that the system so constituted is operable to adapt to movements of a user which movements are smaller than the distance between the user's eyes.

The Examiner states that "Isono et al teaches that the parallax barrier is generated by a liquid crystal panel (28), which implicitly consists of a matrix of light valve pixels such that each of the pixels is electronically switchable. The matrix of pixels therefore serves as the *plurality of switchable shutter elements*."

A vertical parallax barrier stripe does of course contain contiguous pixels, yet such a stripe does not necessarily contain horizontally contiguous pixels, and it is the Applicants opinion that Isono's disclosure specifically shows, in several ways as will be shown below, that no construction including horizontally contiguous *transparent* pixels was contemplated by Isono.

Isono does indeed explicitly contemplate the possibility of a plurality of contiguous opaque stripes, so as to accommodate his parallax barrier system to the display several (i.e., more than two) different stereoscopic views of a scene. The applicant believes, however, that close reading of Isono's text will reveal that Isono did not contemplate use of a plurality of horizontally contiguous *transparent* pixels in his parallax barrier. Nor would such an extension be obvious, given that there exist, as will be shown, significant practical and consceptual barriers to a stereoscopic display of such a configuration.

Moreover, Isono's references to the adaptability of his system to movement of the user, and the limitations of that adaptability as evidenced by his description thereof, clearly exlude any use of the manipulation of the exact horizontal starting and ending points of opaque or transparent regions to render his system adaptable to small changes in the position of a user.

Attention is first drawn to lines 63-69 of Isono's column 2:

"... The head position of the observer who observes the 3D image is monitored and each time the observer moves to the right or left *by only the interval between the pupils*, the phase of the parallax barrier of the barrier display section can be inverted."
(italics added)

A similar statement, concerning control signals for adapting to viewer movement, may be found in column 5, lines 38-44:

"The detecting unit 8 detects the head position of the viewer and generates a display control command to the computer 20 when the head position of the viewer has moved by only a distance E between the right and left eyes."

Isono's "distance E" is the interpupillary distance, the distance between a viewer's two eyes, as clearly defined in his Figure 2. Isono does not contemplate adaptation of his system to viewer position changes of less than distance E, and in the case of a change of distance E, what is modified in Isono's system is the "phase" of the barrier system, but not the subtle position of its elements. That is, in Isono's description, when the user moves as much as the distance between his two eyes (bringing himself into position to see a reversed stereoscopic image) Isono's system is operable to reverse the "phase" of the barrier, turning transparent strips into opaque stripes and the reverse. He does not describe movement of the barrier of a sort that would allow for adaptation of the system to a viewer movement smaller than that of "distance E".

Column 7, lines 9-17 are explicit (note that input unit 6 is "a keyboard, a mouse, or a remote controller"; only unit 8 is a position detector) : "When a rotation command from the input unit 6 or a phase shift command from the detecting unit 8 is supplied as a display control command, the computer 20 generates a barrier movement command to the controller 22. In response to the barrier movement command, the controller 22 drives the drivesr 24 and 26 in such a manner that the parallax barrier displayed on the panel 28 is shifted to the right or left by a distance corresponding to one pixel ina real-time manner." Yet, as we have seen above from the quotes from Isono's column 2 and from his column 5, the effect of this shift is to shift the phase of the barrier, turning transparent to opaque and opaque to transparent. The conclusion seems inescapable that only one pixel of the liquid crystal panel per transparent strip of the barrier is contemplated. Isono's system is not operable to adapt to movements of a user smaller than the cited movement of "distance E", the distance between the viewer's eyes. Therefore the system of amended claims 1, 14 and 21, and dependent claims 6, 15, 28 and 29 appear to be patentably distinct from the system disclosed by Isono.

It may be noted that not only is the system of the present invention not described by Isono, it is non-obvious in view of Isono's patent as well: there exists a significant practical and conceptual barrier to the creation of the barrier system described in the present claims, in that a liquid crystal of extremely fine division is required. Using a plurality (e.g. 6-10) subunits of such a barrier to create each transparent stripe of the barrier, and at least the same number of subunits to create the opaque stripes, providing a useful 3D display system cannot be accomplished, in a practical sense, using standard liquid crystal display panels: the width of individual pixels on standard displays is such as to make the resulting parallax

barrier useless for creating a 3D display: the barrier would be so sparse and the opaque regions so thick that the image would have appeared to have bars in front of it. A specially designed and very finely constructed liquid crystal panel would be required to produce an embodiment of the present system which would produce a pleasing 3D display.

The Examiner has rejected claims 1 and 22-23 under 35 USC 102(b) as being anticipated by the patent issued to Morishima et al (PN 5,875,055).

Claim 1 has been amended. Claim 23 depends from claim 1. Claim 22 has been cancelled.

Claim 1 now specifies a layer of shutter means which comprises multiple switchable shutter elements, said multiple switchable elements are operable to create *horizontally contiguous* alternating first and second subareas arranged across and along said layer. The Applicant respectfully submits that the cited amendment to claim 1 renders it patentably distinct from the device described by Morishima. It may be noted that Morishima's device is explicitly intended to enable switching in conformity with the pattern of refreshing of an image on "normal scan line type display", e.g., a CRT display, which image is refreshed on a line by line basis starting at the top of the CRT screen and proceeding towards the bottom. Consequently, the device described by Morishima must have switchable segments which are themselves horizontal, and arranged one under the other in a vertical stack. In embodiments of the present invention, the switchable areas are used to create a parallax barrier, which, by its nature, must include transparent subareas alternating with opaque subareas which are horizontally contiguous and "stacked" sideways

across the face of a display. Hence the distinction, horizontally contiguous subareas specified in the claims, and vertically contiguous regions shown in Morishima's figures, is necessary and intrinsic to the two systems.

Claim Rejections - 35 USC 103

The Examiner has rejected claim 5 under 35 USC 103(a) as being unpatentable over the patent issued to Isono et al. Claim 5 depends from claim 1, which the Applicant believes is now in condition of acceptance, hence it is the Applicant's belief that claim 5 is now allowable also.

The Examiner has rejected claims 7, 13, 16, and 19 as being unpatentable over the patent issued to Morishima et al. Claim 19 has been canceled. Claims 7 and 16 have been amended to specify that the multiple on and off switchable polarization rotating regions are *horizontally contiguous*. This condition does not exist and (as shown above) cannot exist for the device presented by Morishima. Consequently, the Applicant believes that these claims, and claim 13 which depends from claim 7, are now patentably distinct from the device presented by Morishima, and consequently are in condition for allowance.

Claims 14, 24, and 25 have been rejected by the Examiner under 35 USC 103(a) as being unpatentable over the patent issued to Morishima et al in view of the patent issued to Isono et al. It is the Applicant's belief that the amendments to claim 14, specifying that the on and off switchable polarization rotating regions are horizontally contiguous, distinguishes the claimed invention from the device presented by Morishima, and consequently that claim 14 and dependant claim 25 are allowable over Morishima. Claim 24 has been cancelled.

Claims 8-12 and 20 have been rejected by the Examiner under 35 USC 103(a) as being unpatentable over the patent issued to Morishima, and further in view of the patent issued to Isono et al. Claims 8-12 depend on claim 7, which has been amended to specify that the multiple on and off switchable polarization rotating regions are horizontally contiguous as discussed above. The Applicant believes claims 8-12 to be allowable along with amended claim 7, for the reasons stated above. Claim 20 has been cancelled.

Claims 7-11, 14, 15 and 16-20 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 4, 6 and 10 of U.S. Patent No. 5,822,117. Applicant previously submitted a Terminal Disclaimer with respect to Patent No. 5,822,117 in the response filed on March 7, 2003. A copy of this Terminal Disclosure is enclosed herewith.

In view of the foregoing, it is submitted that all the claims now pending in the application are allowable over the cited reference. An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,


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Encl.:

A three months extension fee.